

combination of MgO, Al₂O₃ and its hydrates, Mg(OH)₂ and its hydrates, Na₂(CO₃)₂ and its hydrates, Ca(OH)₂, Fe(OH)₂ and its hydrates, hydrotalcite and hydrotalcite-like compounds and their hydrates, and cellulose which have been calcined sufficiently to conform to the empirical formula [of Claim 1] $M'_m M''_n (OH)_{(2m+3n+qa+br)} (A^q)_a (B^r)_b \cdot xH_2O$.

24. (Amended) The composition of Claim 21 wherein the material conforming to the empirical formula [of Claim 1] $M'_m M''_n (OH)_{(2m+3n+qa+br)} (A^q)_a (B^r)_b \cdot xH_2O$ is a mixture of magnesium oxide, aluminum oxide (hydroxide), and sodium aluminate.

Please cancel Claims 25-48.

Please see Appendix A for the marked versions of the amendments to the specification and to the indicated claims, and Appendix B for the clean versions of the specification sections and claims. The amendments to the specification and claims will be more fully discussed below with reference to the examiner's objections and rejections thereto as set forth in the office action. Applicant notes that the present Response includes a Request for Extension of Time for a one-month period (Appendix C), to extend response time from December 25, 2002 to January 25, 2003, and appropriate Credit Card Authorization Form (Appendix D) to charge for the fee required for such extension.

Claim Status

The above-indicated application was originally presented with forty-eight (48) claims. However, Claims 25-48 have, by this paper, been cancelled. The independent claims currently outstanding are Claims 1, 18, 19, and 21. Claims 2-17, 20, and 22-24 are the outstanding dependent claims. Currently claims 1-14, 16-21, and 23 stand rejected, and claims 15, 22, and 24 stand objected to. Although Claims 25-48 stand rejected, due to their cancellation that rejection is now deemed to be moot. Accordingly, all references to Claims 25-48 in the addressed office action will not receive further discussion in this Response A.

Applicant acknowledges the examiner's entrance of Form PTO-903, dated 23 November 2001, as Paper No. 2.

Oath/Declaration

Applicant acknowledges the examiner's notation that the oath or declaration is deemed defective. The basis for this statement by the examiner is that the referenced application, U.S. application 09/478,425, filed 01/06/2000, is not a foreign application, and thus any priority claim thereto would be based upon 35 USC 120 rather than 35 USC 119(a)-(d).

In response to this objection, Applicant is herewith submitting a new oath/declaration (Appendix E) in which the incorrect priority claim basis has been deleted, and respectfully requests substitution of the new document in place of the document which has been objected to by the examiner. It is believed that, with this new document, this defect has now been corrected. It is Applicant's understanding that, because this U.S. national application is based on International Application No. PCT/US01/00276, filed January 5, 2001, and because the priority claim in that application to U.S. Application Serial Number 09/478,425, filed January 6, 2000, now issued as U.S. Patent 6,365,639 B1, was already established in the PCT proceedings, that Applicant's claim to ultimate lineage from that original U.S. filing is fully established for all purposes including enforcement of any patent issuing from the present application. If for any reason Applicant is incorrect in this understanding, it is respectfully requested that Applicant be informed as such. It is also believed that, because this new oath/declaration is simply a corrected substitute for the original, no fee for submission of such after initial filing, under 37 CFR 1.16(e), is required. However, if Applicant is incorrect and a fee is due, prompt notification thereof is respectfully requested to enable Applicant to promptly correct such deficit.

Drawings

Applicant acknowledges the examiner's notation as to the informality of the drawings submitted with the original filing. Formalization of the drawings will be handled appropriately upon receipt of a Notice of Allowance.

Specification

The disclosure stands objected to on the basis that the application does not properly cross-note the continuing status in the first sentence of the application, as required under 37 CFR 1.78.

Applicant has, by this paper, requested amendment of the specification to include such cross-reference. Accordingly, it is believed that this rejection has now been overcome.

Claim Objections

The examiner has objected to claims 15, 22 and 24 as being improper under 37 CFR 1.75(c) because a multiple dependent claim should refer to other claims in the alternative only. (Reference to MPEP 608.01(n)) Applicant notes that the listed claims have now been amended to eliminate multiple dependencies. Accordingly, it is believed that these claims are in condition for examination on the merits and consideration thereof is now respectfully requested.

Claim Rejections under 35 USC 112

6) Claims 1-14, 16-21 and 23 stand rejected under 35 USC 112, first paragraph, on the basis that the specification does not reasonably provide enablement for M' as a Group IA element.

Applicant acknowledges this unintentional oversight and has hereinabove requested amendment of the specification at page 8, lines 19-22, to eliminate Group IA from the list of possible divalent cations. As noted clearly in the specification at that location, Applicant intended to define M' as divalent cations and M'' as trivalent cations, and did not intend to include any definition of M, without superscript, as a comprehensive term. It is believed that this amendment corrects this oversight while it does not introduce any new matter. In view of this, Applicant believes that this rejection has been overcome and its withdrawal is respectfully requested.

8) Claims 1-14, 16-21, and 23 stand rejected under 35 USC 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

Applicant respectfully traverses this rejection and points out that certain amendments have now been requested which, in his view, overcome this rejection. Specifically, Applicant has now eliminated the word "substantially". While Applicant

still intends for Claim 1 to enjoy the full benefit of application of the Doctrine of Equivalents in interpretation of its scope, Applicant is willing to delete the word “substantially” as simply a redundant but, by oversight, otherwise undefined expression of Applicant’s intent.

The examiner also notes that either A or B can be a hydroxyl anion, OH⁻. This is absolutely Applicant’s intention. However, because the terms “A” and “B” must inherently be different (hence the use of different designations for them), only one can be hydroxyl. As Applicant has explained his invention, there must be at least an “A” to meet the formula. See the specification at page 8, lines 24-25 to page 9, line 3. However, “B” is an optional, second anion. While the examiner has questioned “how the skilled artisan should interpret the proviso statements defining $qa+br$ as not being greater than $2m+3n$, qa cannot equal $2m+3n$, and $(2m+3n+qa+br)$ is less than 3”, Applicant believes that these statements are fully self-explanatory based upon the ions known to be present. The provisos are deemed by Applicant to be necessary to ensure that the claims clearly define Applicant’s inventive material, and therefore it is believed that the provisos, in addition to the rest of the claim(s) language, meet the requirements of the statute by ensuring that the skilled artisan is fully apprised thereby of whether his or her material or practice falls within the scope of the claim(s). In short, the skilled artisan need only “plug in” the amounts and identities of constituents in a given composition to see if it meets Applicant’s formula. As such, it is believed that the claims are not in any way indefinite and are, in fact, extremely specific in defining Applicant’s new family of materials and applications therefor.

The examiner has also alleged that Claim 1 is indefinite regarding the scope of the terms M’ because of the inclusion of Group IA. Applicant notes that Group IA has now been deleted, as already discussed hereinabove with regard to the specification, and its deletion in Claim 2 has also been hereby requested to ensure consistency between the specification and the claims. Again, Applicant believes that this amendment to the claims is fully supported by the specification, which now consistently identifies M’ as a divalent cation which, by definition, cannot possibly be selected from Group IA. Furthermore, it is believed that its deletion is a simple correction and does not introduce

new matter, since including it in the first place was an obvious error. Accordingly, withdrawal of this ground of rejection is now respectfully requested.

The examiner has also stated that Claim 2 is confusing because M is not provided for therein. Again, Applicant has requested amendment to correct this reference and to substitute therefor M'. It is believed that, with this correction, this rejection has now been overcome and its withdrawal is respectfully requested.

The examiner has also questioned whether the term "calcined", in Claim 4, modifies only "hydrotalcite" or "hydrotalcite, hydrotalcite-like compound, or mixtures thereof". Applicant believes that the amendment requested hereinabove to Claim 4 clarifies Applicant's intention that it modify potentially both "hydrotalcite" and "hydrotalcite-like" and mixtures thereof. The examiner goes on to say that that it is not clear how "hydrotalcite" and "hydrotalcite-like compounds" differ from one another. The Applicant respectfully traverses this rejection and refers the examiner to the specification at page 9, lines 4-12, wherein it is stated clearly that "hydrotalcite" refers to a specific compound, i.e., $\text{Mg}_6\text{Al}_2(\text{CO}_3)(\text{OH})_{16}\cdot 4\text{H}_2\text{O}$; while "hydrotalcite-like compounds" are compounds containing Mg, Al, (CO_3) and (OH) in any proportions which meet the empirical formula used in Applicant's Claim 1 but which do not meet the formula for hydrotalcite, i.e., which do not conform to $\text{Mg}_6\text{Al}_2(\text{CO}_3)(\text{OH})_{16}\cdot 4\text{H}_2\text{O}$.

Applicant notes for the examiner's understanding that, since "hydrotalcite" as defined does not meet the empirical formula, it must be first calcined as described in order to do so. However, the "hydrotalcite-like compounds" are defined as those that already meet the formula (other than hydrotalcite per se). Such compounds could therefore conceivably be useful in the present invention either with or without calcination. Hence, Applicant's clarification with regard to Claim 4. However, Applicant adds that he does anticipate that probably a more convenient route to the material claimed as conforming to the empirical formula of Claim 1 would be via calcination of a mixture of compounds that supply the necessary ions in various proportions, such that the resulting "hydrotalcite-like compound" meets the empirical formula. It is believed that the scope of this definition is very clear and that all metes and bounds of the term "hydrotalcite-like compounds" are determined thereby. Accordingly, withdrawal of this rejection is now respectfully requested.

The examiner notes that in Claim 11 it is unclear wherein the method further comprises the materials set forth therein. Applicant thanks the examiner for his suggestions and have now included the term “adding”. It is believed that this rejection has now been overcome and its withdrawal is now respectfully requested.

The examiner has also questioned the reference to the ratio in Claim 14. Applicant has now specified that it is a weight/weight ratio.

The examiner has deemed Claim 18 to be indefinite on the basis that it is unclear in referring to the material conforming to the formula of Claim 1. In response to this rejection Applicant has herein requested amendment to Claim 18 to clarify. Although the examiner has commented that Claim 20 is unclear, Applicant believes that the amendment to Claim 18 rectifies any problem seen in Claim 20 and that amendment of Claim 20 itself is unnecessary. It is believed that this problem has now been appropriately corrected.

While Applicant acknowledges the examiner’s comments as to Claims 25-40 and 42-47 in the relevant (112) portion of the office action, Applicant again wishes to briefly note that these claims are now cancelled and therefore that all rejections thereof are now rendered moot.

Claim Rejections Under 35 USC 102

10) Claims 18-19 stand rejected under 35 USC 102(b) as being anticipated by Norman et al., 3,948,809. The examiner urges that Norman et al. discloses the calcination of bauxite waste liquors after addition of sodium carbonate or sodium hydroxide at temperatures of 400°C to 900°C, and concludes that the disclosure reads on the compositions and processes of Applicant’s referenced claims.

Applicant respectfully traverses the reference applicability of the Norman et al. patent under 35 USC 102(b). This statutory section requires that the reference invention anticipate the invention being examined, i.e., that the inventions are essentially identical. However, it is very clear to those skilled in the art that, in contrast, the Norman et al. patent discloses an invention directed to a different objective, using a different starting material, processed at a different temperature, with a different product resulting

therefrom. Such lack of correlation can hardly be held to constitute anticipation as defined.

To contrast these aspects in order: First, Norman et al.'s objective is to produce an absorbent for treatment of sulphur-containing oxides. Norman et al. abstract at lines 1-3 and column 1, lines 32-34. In stark contrast, Applicant's objective is to produce a material that can be combined with clay and water as a rheology modifier, exhibiting stress-dependent fluidity, that is particularly useful for drilling and similar applications.

Second, Norman et al.'s starting material is defined as a material that results from "leaching an oxide-containing material, such as bauxite, with an alkaline solution," followed by additional steps including evaporating to dryness to produce a solid. Norman et al. abstract at lines 3-5; column 1, lines 35-44; column 2, lines 20-26; and column 4, lines 30-41. Applicant's starting material can be (but does not have to be) a "wastestream" resulting from bauxite processing, to which a magnesium source has thereafter been added. This is to say, the bauxite itself is not targeted as a potential starting material, but rather the reaction product of the bauxite effluent to which (usually) magnesium oxide has been added, in that case serving to initiate precipitation of the HTC-GL product; thus, the starting material contemplated as just one alternative by Applicant is not an aluminum oxide evaporant. Applicant therefore does not contemplate "leaching of bauxite" itself, which in Norman et al.'s invention will be entirely deficient in any magnesium constituent and therefore most assuredly not a "hydrotalcite or hydrotalcite-like material" which, by definition, must contain such magnesium. In contrast, such magnesium (or equivalent divalent metal cation selected from one of the proposed groups) is critical in Applicant's invention and is clearly disclosed as critical in a large number of locations, e.g., at page 7, lines 15-22 of Applicant's specification.

Another difference in the precalcination (i.e., starting) material used in Norman et al. is that an alkali metal carbonate must be added thereto. Norman et al. at column 2, lines 6-13. In contrast, in Applicant's precalcined material, an alkali metal carbonate is already present, an artifact of the bauxite processing, but such is not present in bauxite itself.

Additional differences between the starting material used in the two inventions include the fact that Norman et al.'s patent requires a filtration step in which the filtrate is

used to produce the precalcined product and the undissolved solids are not used. Norman et al. at column 2, lines 42-43. Applicant's precalcined product is produced from the filtered solids and the filtrate is not used. Thus, these aspects of the comparative processes are essentially reversed.

Also noteworthy is the fact that Norman et al.'s leached precalcined filtrate must be dried prior to calcinations because the desired material is essentially 100% soluble. In contrast, Applicant's precipitated precalcined product is substantially insoluble.

Finally, in addition to starting with a different material, Norman et al. is processing it differently. Norman et al. describes calcinations of the starting material at a temperature of 400-900°C; however, only a temperature of 650°C is shown in the examples, and Claim 5 of that patent notably claims the narrower range of 600-700°C. Norman et al. at column 2, lines 42-43, and column 4, lines 47-48. Applicant has clarified throughout his specification that his calcinations, conducted at generally higher temperatures and in the presence of sodium, were found (long after the 1976 issue date of the Norman et al. patent) to result in unexpected and surprising results, i.e., a very different final product, from that which was earlier believed to result from any known calcinations at lower temperatures. Applicant has found that his unique final product will not occur, using hydrotalcite as a starting material, unless the calcination temperature is at least about 750°C, and preferably from about 900°C to about 1000°C.

Applicant further asserts that, for the same reasons, Applicant's invention cannot alternatively be found to be obvious in view of Norman et al. and therefore would not appropriately be rejected under the so-called inherent 103 rejection. Those skilled in the art would be unlikely to look to art disclosing absorbents for sulphur oxide-containing materials in order to obtain disclosure necessary to invent a material which could be combined with clay and water for rheology modification. Furthermore, even if one aspect of Norman et al. could arguably be said to be "in common" with Applicant's invention – i.e., they both use or potentially could use an aluminum oxide material at some point – this one-point overlap can hardly be said to teach any of the important features of Applicant's invention. Indeed, if such were the case, then any art using aluminum oxide in any sense would have to be seen as reading on all future art using

aluminum oxide, and the art area would therefore be considered to be “closed” to future invention. Such is obviously not the intent of the patent laws.

In view of the many differences between the objective, materials, process and results of the Norman et al. patent as enumerated above, Applicant believes that that reference cannot support the rejection under 35 USC 102(b) and therefore that this rejection has now been overcome. Accordingly, its withdrawal is now respectfully requested.

Claim Rejections Under 35 USC 103

12) The examiner has rejected Claims 1-4, 7, 10, 14, 18-21 and 23 under 35 USC 103(a) as being unpatentable over Burba, III et al., US 5,232,627 (hereinafter Burba), taken with Martin et al., U.S. 5,728,363 (hereinafter Martin). The examiner alleges that Burba discloses making clay adducts with natural and synthetic hydrotalcites characterized as AHMMO, and teaches use of such as rheological agents in aqueous compositions. He also urges that the same patent discloses naturally occurring hydrotalcites containing some CO₂ in its structure which, when thermally dehydrated, yield an active magnesium aluminum oxide compound or oxyhydroxide compound. In example 3, it is alleged, Burba teaches the compositions characterized as clay adducts with spinels activated above 500°C. Finally, Burba allegedly teaches a formula which is disclosed therein as crystalline mixed metal hydroxides (MMOH) used to create the mixed metal oxides or oxy-hydroxides (AHMMO) having a structure having a value of “(2m+3n+qa+br)” which is equal to or greater than 3.

The examiner notes that Burba differs in that the Applicant’s claims have a value meeting (2m+3n+qa+br) of less than 3. From this, the examiner concludes that such materials would have been obvious to one of ordinary skill in the art at the time of Applicant’s invention as an oxyhydroxide or as a known activated hydrotalcite additive known in the art.

The examiner continues on to say that Martin discloses methods of making hydrotalcites and hydrotalcite-like products and characterizes said hydrotalcites as layered double hydroxides. Martin is urged to disclose the hydrotalcites and hydrotalcite-

like products as useful as viscosity/rheology control agents. The examiner admits, however, that Martin differs from Applicant's claims in that it includes an explicit disclosure of an aqueous clay composition employing the Martin hydrotalcites.

Based on the above, the examiner concludes that Burba and Martin are combinable because they teach calcined or activated hydrotalcites and associated structures. He states that it would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to employ the calcined hydrotalcites of Martin in the compositions of Burba. Finally, the examiner believes that it would have been obvious to employ the compositions of Burba as viscosity/rheology control agent compositions a la Martin.

Applicant respectfully and vigorously traverses the examiner's rejection as paraphrased hereinabove. Applicant is, of course, intimately familiar with the Burba invention because Applicant himself is one of the inventors thereof. Thus, Applicant is particularly cognizant of the important differences between the Burba invention and his present invention, and wishes to respectfully point out the differences between the Burba disclosure and Applicant's claims.

There are key differences between Burba and Applicant's invention. The first is that Burba represents a material that is simply dehydrated. It is this dehydrated product – i.e., one as to which its excess waters of hydration (usually represented formulaically as " $\cdot xH_2O$ ") have been removed at elevated heat. Thus, Burba discloses use of an "activated" mixed metal oxide or oxyhydroxide that is the product of the dehydration of hydrotalcite or of a mixture which comprises magnesium oxide and aluminum oxide, and which contains at least one compound conforming to Burba's given formula. This dehydration/activation is carried out via heating at 400-700°C. See Burba at column 2, lines 39-43. Heating at higher temperature is, in fact, explicitly proscribed (see column 2, lines 32-36) because it was believed that a substantially inert substance (such as a spinel) results at higher temperature.

Applicant's invention is an entirely different material. While it can be formed by heating at the higher temperatures taught by Applicant (e.g., preferably 900-1000°C), it is the composition itself, regardless of the method of its preparation, that is unique and novel. Simply stated, dehydration of a Burba starting material will in no circumstances

produce a final material conforming to all of the requirements of Applicant's claims and, most particularly, to the $(2m+3n+qa+br)$ proviso. The value of $(2m+3n+qa+br)$ will always be 3 or greater. However, heating such a Burba starting material to Applicant's disclosed higher temperatures (which are explicitly proscribed by Burba), will in some cases produce a final material in which $(2m+3n+qa+br)$ is less than 3 and, in preferred cases, very substantially less than 3 (e.g., less than 1).

In addition to adhering to different proportional limitations, it is also important to note that the materials do not perform at all comparably as rheology modifiers. In fact, it was Applicant's personal knowledge of the performance limitations of the subject matter of the Burba invention as well as of all other patents and literature disclosures known to him, that led Applicant to eventually invent the novel rheology modification agents and related methods and products. Again, simply stated, the rheology modification agents of Burba, in which $(2m+3n+qa+br)$ is equal to 3 or greater, operate to modify rheology much more slowly, and with a less marked shear-thinning effect, than those of Applicant's present invention. The obvious conclusion from this is that, where the sum of this equation is less than 3, and particularly where it is substantially less than 3, different chemical and/or structural features are inferably present in the molecule.

The above information is intended to assist the examiner in understanding that the two compositions are so different that, to say one is obvious in light of art disclosing the other is tantamount to saying that (as already noted in connection with Norman et al.), all compositions based on magnesium and aluminum are obvious in light of one another. Such is obviously not the case. Applicant further points out that, while the disclosed heat preparation method, in which sodium plays an important part but does not become a part of the final product crystal, is one method to arrive at Applicant's unique family of compositions, any means effective to achieve the desired proportions can be employed for their preparation.

Applicant believes that, in view of the above critical differences between Burba and Applicant's invention, he has shown the inapplicability of the Burba reference per se. However, taking Burba with Martin is also insufficient to support the 103 rejection as delineated by the examiner. Martin describes a method of making synthetic hydrotalcite but, contrary to the examiner's statement, does not show calcinations thereafter, or even

some kind of dehydration/”activation” as disclosed by Burba. Thus, even if Martin is read as disclosing the use of hydrotalcites, or “activated” hydrotalcites, as rheology modifiers, its combination with Burba would, at best, disclose using a material whose performance is already illustrated (in Applicant’s Comparative Example A) to be inferior to that of Applicant’s present invention.

Applicant believes that, based on the above facts, his invention is supported to be unexpected and surprising when viewed through a combination of Burba and Martin as explained by the examiner. Accordingly, withdrawal of this rejection is now respectfully requested.

13) Claims 1-10, 14, 16-21 and 23 stand rejected under 35 USC 103(a) as being unpatentable over Burba in view of Misra, US 4,656,156. The basis for this rejection as to Burba appears to Applicant to be substantially the same as given with regard to the Burba/Martin rejection discussed hereinabove. As to Misra, the examiner states that the abstract thereof discloses making activated synthetic hydrotalcite from industrial Bayer liquor. He further maintains that Misra discloses activating the compositions from about 500 to 600°C in a rotary calciner, and adding the magnesium hydroxide to a solution containing ions of aluminate, carbonate, and hydroxide, such as those containing alkali hydroxide, alkali carbonate and aluminum oxide. He notes that said solutions are derived from the Bayer process liquor in making alumina from bauxite.

The examiner maintains that these references are combinable because they teach activated hydrotalcite and clay adducts employing activated hydrotalcites, and that therefore it would have been obvious to one of ordinary skill in the art at the time of Applicant’s invention to employ the Misra activated hydrotalcites in the compositions of Burba as an “art-known” activated hydrotalcite. The examiner adds that Claims 5 and 6 are included for rejection purposes since the calcinations temperatures for the calcined hydrotalcites have allegedly not been shown to be critical. The examiner states that “merely modifying the process conditions taught as a result-effective variable such as temperature and concentration is not a patentable modification absent a showing of criticality.”

Applicant respectfully traverses this rejection and points out that adding Misra to Burba still does not overcome the basic patentability of Applicant's invention. First of all, Misra teaches a material that is amorphous, in stark contrast with Applicant's invention. Misra also teaches a very low temperature for its calcination, which means that, as Applicant has argued herein and illustrated thoroughly in the present specification and examples, Misra cannot in any way be read as leading one skilled in the art toward using a temperature that, in combination with either the Misra or Burba starting material, is sufficiently high to yield Applicant's unique and unexpected composition. As Applicant has clearly stated hereinabove, Applicant's material is not an "activated" hydrotalcite or clay adduct thereof. It is, rather, an entirely new composition that may, in one embodiment, be produced by heating a hydrotalcite or hydrotalcite-like material at temperatures which are not taught in the art (and are, in fact, actually taught away from), and in the presence of sodium – but which composition is independent of its method of making.

Applicant wishes to continually stress to the examiner that Applicant's claims are to a composition that is clearly defined by those claims in terms of constituency and proportions. Accordingly, there is nothing in the art as known to Applicant (and as cited in the entirety of the office action being countered herein) that shows either a composition whose constituency and proportions would or should match those of Applicant, or that shows processing of a hydrotalcite, processing or use of a hydrotalcite-like compound, or processing of other magnesium- and aluminum-containing starting materials from which it could be inferred that a composition matching that of Applicant is being produced thereby.

14) Claims 11-13 stand rejected under 35 USC 103(a) as being unpatentable over Burba, taken with Martin as applied to claims 1-4 and 7-11 hereinabove, and further in view of Keilhofer et al. US 6,025,303 (hereinafter Keilhofer) and/or either Watkins et al., US 4,580,633 (hereinafter Watkins) or Wyganowski, US 5,036,915. The examiner's basis for this rejection is that Burba and Martin show viscosity/rheology control compositions but differ from the claims in the further addition of aluminum oxide and the concentration thereof. He states that Keilhofer discloses solid based compositions

employing activated hydrotalcites and at least one solid base including aluminum trihydroxide. From this he concludes it would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to employ an aluminum hydroxide as disclosed in the Keilhofer reference as a suitable base material for pH modification in the powdered form. He goes on to state that Watkins et al. teaches the addition of nitrogen containing compounds as viscosity modifiers in subterranean formation, which contain fines including montmorillonites as the most common material encountered. Watkins, it is urged, teaches suitable nitrogen compounds including ammonium ion precursors which are water-soluble and hydrolyse in steam such as urea and thiourea. Wyganowski, it is urged, teaches urea as a rheological for clay compositions and a pH modifier. The examiner concludes that these references are combinable because they teach rheological clays and additives employed to modify clay compositions and formations. In view of this, the examiner alleges, it would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to employ urea or thiourea a conventional additive in the Burba compositions as a rheological or pH modifier for the clays therein.

Applicant respectfully traverses this rejection on the following basis. As the examiner has noted, Claims 11-13 are to the inclusion of an aluminum oxide and/or a nitrogen-containing compound, in which role it serves to enhance the temperature stability of the rheologically-modified composition formed when Applicant's novel rheology modification agent (defined by the formula of Claim 1) is combined with the clay and water included in that claim. In stark contrast, Keilhofer teaches addition of a particular base (aluminum trihydroxide), which is theoretically intended to represent a dry material which can be added to the Keilhofer compositions to produce a "one-bag" product which, following combination with water and clay, has a pH under which the Keilhofer composition exhibits rheology modification. Applicant believes, however, that given the chemical characteristics of aluminum trihydroxide, it is highly unlikely that such material will be even soluble to any significant extent, and therefore operable, in the Keilhofer composition. Since it would not be significantly soluble, it certainly would not contribute to enhancement of temperature stability in that composition. It can therefore also be said that it is unreasonable to conclude that Keilhofer fairly teaches temperature enhancement of a different composition, such as Applicant's, using an aluminum oxide.

Watkins and Wyganowski also differ markedly from Applicant's invention in important ways. Each shows use of ammoniacal compounds to inhibit swelling of clay by interfering with water absorption. This is exactly the opposite of what Applicant is attempting to do, which is to permit uninhibited clay swelling in order to ensure that applicant's product is fully able to react with the clay.

Thus, none of the three tertiary references (Keilhofer, Watkins, or Wyganowski), can fairly be said to teach temperature stability enhancement through use of aluminum oxide or nitrogen-containing compounds, or combinations thereof; Keilhofer teaches only pH adjustment in general; and Watkins and Wyganowski actually teach against including nitrogen-containing compounds in a clay/water/rheology modification agent system. Furthermore, combining these teachings with those of the primary reference (Burba) and the secondary reference (Martin) still neither teaches nor discloses the unexpected and surprising enhancement of enhanced temperature stability accomplished by addition of an aluminum-containing compound, nitrogen-containing compound, or mixture thereof to the composition of Claim 1. Accordingly, Applicant believes that this rejection has now been overcome, and its withdrawal is now respectfully requested.

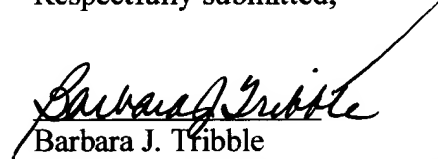
Applicant acknowledges the nonstatutory double patenting rejection based on a judicially created doctrine, under which Claims 1-14, 16-21 and 23 now stand rejected. The basis for this rejection is claims 1-8 of US Patent 6,365,639 B1. Enclosed herewith as Appendix F is a terminal disclaimer to counter this provisional rejection as well as appropriate fee thereto. Accordingly, it is believed that this rejection, though still provisional, has now been rendered moot and its withdrawal is respectfully requested.

Conclusion

Applicant respectfully acknowledges the citation of prior art made of record and not relied upon as a basis of rejection.

In summary, Applicant notes that he has now made the specification changes as required, presented arguments to the examiner's rejections, which arguments Applicant himself deems persuasive, and has furthermore amended his claims. It is believed that this combination of actions on his part renders this Response A fully responsive to the office action. Applicant also believes that he has corrected all formalities deficits and that all stated objections and 112, 102 and 103 rejections are now overcome. Accordingly, it is believed that the twenty-four (24) claims as currently constructed are fully in condition for allowance. Such allowance is now most respectfully requested.

Respectfully submitted,



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Appendix A
Marked Versions of Amendments

In the Specification:

(insert after the title on page 1)

--CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a U.S. national application based on International Application No. PCT/US01/00276, filed on January 5, 2001, which claims priority to U.S. Application serial Number 09/478,425, filed January 6, 2000, now issued as U.S. Patent 6,365,639 B1.--

(insert at page 8, lines 19-22)

--- While M' can represent any divalent metal cation of the Groups [IA,]IIA, VIIB, VIII, IB or IIB of the Periodic Table, preferred divalent cations are Mg, Ca, Mn, Fe, Co, Ni, Cu, and Zn, and more preferred are Mg and Ca. ---

In the Claims:

1. (Amended) A method of making a rheology-modified aqueous composition comprising admixing a material or materials whose constituents [substantially]conform to the proportions of the empirical formula



where M' represents at least one divalent metal cation and m is an amount of from greater than zero to about 8;

where M'' represents at least one trivalent metal cation and n is an amount of from greater than zero to about 6;

where Z is an anion or negative-valence radical that is monovalent or polyvalent, and a is an amount of A ions of valence q, provided that if A is monovalent, a is from greater than zero to about 8, and if A is polyvalent, a is from greater than zero to about 4;

where B is a second anion or negative-valence radical that is monovalent or polyvalent, and where b is an amount of B ions of valence r and b is from zero to about 4;

provided (n+n) is greater than or equal to 1;

further provided qa+br cannot be greater than 2m+3n, and provided that qa cannot equal 2m+3n;

and still further provided that (2m+3n+qa+br) is less than 3; and

where xH₂O represents excess waters of hydration, with x being zero or more;

with at least a clay and water to form a rheology-modified aqueous composition.

2. (Amended) The method of Claim 1 wherein [M] M' is selected from Groups [IA,]IIA, VIIB, VIII, IB or IIB of the Periodic Table.

4. (Amended) The method of Claim 3 wherein the material is a calcined hydrotalcite, a calcined or uncalcined hydrotalcite-like compound, or mixture thereof.

11. (Amended) The method of Claim 1 further comprising [as components] adding an aluminum oxide, a nitrogen-containing compound, or both.

14. (Amended) The method of Claim 1 wherein the weight/weight ratio of clay to the material or materials having constituents [substantially]conforming to the

proportions of the empirical formula $M'_m M''_n (OH)_{(2m+3n+qa+br)} (A^q)_a (B^r)_b \cdot xH_2O$ is from about 99:1 to about 9:1.

15. (Amended) The method of Claim 11 wherein the amount of aluminum oxide is from about 5 to about 35 weight percent, and the amount of the nitrogen-containing compound is from about 20 to about 120 weight percent, based on the weight of the clay and the dry material or materials conforming to the proportions of the empirical formula [of Claim 1] $M'_m M''_n (OH)_{(2m+3n+qa+br)} (A^q)_a (B^r)_b \cdot xH_2O$.

18. (Amended) A dry rheology modification agent comprising a material prepared from a combination of MgO, Al₂O₃ and its hydrates, Mg(OH)₂ and its hydrates, Na₂(CO₃)₂ and its hydrates, Ca(OH)₂, Fe(OH)₂ and its hydrates, hydrotalcite and hydrotalcite-like compounds and their hydrates, and cellulose, which have been calcined sufficiently to produce a material conforming to the [formula of Claim 1] proportions of the empirical formula



where M' represents at least one divalent metal cation and m is an amount of from greater than zero to about 8;

where M'' represents at least one trivalent metal cation and n is an amount of from greater than zero to about 6;

where Z is an anion or negative-valence radical that is monovalent or polyvalent, and a is an amount of A ions of valence q, provided that if A is monovalent, a is from greater than zero to about 8, and if A is polyvalent, a is from greater than zero to about 4;

where B is a second anion or negative-valence radical that is monovalent or polyvalent, and where b is an amount of B ions of valence r and b is from zero to about 4;

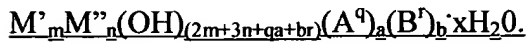
provided (m+n) is greater than or equal to 1;

further provided qa+br cannot be greater than 2m+3n, and provided that qa cannot equal 2m+3n;

and still further provided that (2m+3n+qa+br) is less than 3.

22. (Amended) The rheology modified aqueous composition of Claim 21 wherein the material is prepared from a combination of MgO, Al₂O₃ and its hydrates, Mg(OH)₂ and its hydrates, Na₂(CO₃)₂ and its hydrates, Ca(OH)₂, Fe(OH)₂ and its hydrates, hydrotalcite and hydrotalcite-like compounds and their hydrates, and cellulose

which have been calcined sufficiently to conform to the empirical formula [of Claim 1]



24. (Amended) The composition of Claim 21 wherein the material conforming to the empirical formula [of Claim 1] $\underline{M'_m M''_n (OH)_{(2m+3n+qa+br)} (A^q)_a (B^r)_b \cdot xH_2O}$ is a mixture of magnesium oxide, aluminum oxide (hydroxide), and sodium aluminate.

Claims 25-48 are cancelled.